

CLAIMS

1. A thrust needle roller bearing (10A, 10B) having a washer (1) formed of a thin steel plate and a needle roller (2), wherein at least said washer (1) has a nitrogen enriched layer at a surface layer portion, amount of retained austenite in said surface layer portion is at least 5 volume % and at most 25 volume %, and austenite grain size number of said surface layer portion is 11 or higher.

2. The thrust needle roller bearing (10A, 10B) according to claim 1, wherein nitrogen content of said surface layer portion is in the range of 0.1 mass % to 0.7 mass %.

3. A support structure (10A, 10B) receiving thrust load of a compressor for a car air-conditioner (100, 200, 300) in which a swash plate (103, 203, 303) rotates as a main shaft (104, 204, 304) rotates and a piston (107, 207, 307) swings accordingly, including

a thrust needle roller bearing (10A, 10B) receiving thrust load generated by the rotation of said swash plate (103, 203, 303), having a washer (1) formed of a thin steel plate and a needle roller (2), wherein at least said washer (1) has a nitrogen enriched layer at a surface layer portion, amount of retained austenite in said surface layer portion is at least 5 volume % and at most 25 volume %, and austenite grain size number of said surface layer portion is 11 or higher.

4. The support structure (10A, 10B) receiving thrust load of a compressor for a car air-conditioner according to claim 3, wherein nitrogen content of said surface layer portion is in the range of 0.1 mass % to 0.7 mass %.

5. A support structure (510) receiving thrust load of an automatic transmission

including a torque converter having an impeller (501) and a turbine (503) opposite to each other with a stator (502) in between, comprising

a thrust needle roller bearing (10A, 10B) having a washer (1) formed of a thin steel plate and a needle roller (2), at least between said stator (502) and said impeller (501) or between said stator (502) and said turbine (503), wherein

at least said washer (1) has a nitrogen enriched layer at a surface layer portion, amount of retained austenite in said surface layer portion is at least 5 volume % and at most 25 volume %, and austenite grain size number of said surface layer portion is 11 or higher.

6. The support structure (510) receiving thrust load of an automatic transmission according to claim 5, wherein nitrogen content of said surface layer portion is in the range of 0.1 mass % to 0.7 mass %.

7. A support structure (10) for a continuously variable transmission (600) in which rotation of an input shaft (601) is changed in a nonstep manner and transmitted to an output shaft (603), including

a thrust needle roller bearing (10A, 10B) receiving thrust load generated by the rotation either of said input shaft (601) or said output shaft (603), having a washer (1) formed of a thin steel plate and a needle roller (2), wherein at least said washer (1) has a nitrogen enriched layer at a surface layer portion, amount of retained austenite in said surface layer portion is at least 5 volume % and at most 25 volume %, and austenite grain size number of said surface layer portion is 11 or higher.

8. The support structure (10) for a continuously variable transmission (600) according to claim 7, wherein nitrogen content of said surface layer portion is in the range of 0.1 mass % to 0.7 mass %.

9. A support structure (10A, 10B) receiving thrust load of a manual transmission allowing, by engagement between a gear (664a, 664b) of an input shaft (661) and a gear (664h to 664k) of a counter shaft (663) and engagement between a gear (664h to 664k) of the counter shaft (663) and a gear (664c to 664g) of an output shaft (662), stepwise change of speed of rotation of said output shaft (662) from the speed of rotation of said input shaft (661), including

a thrust needle roller bearing (10A, 10B) receiving thrust load of any of said input shaft (661), said counter shaft (663) and said output shaft (662), having a washer (1) formed of a thin steel plate and a needle roller (2), wherein at least said washer (1) has a nitrogen enriched layer at a surface layer portion, amount of retained austenite in said surface layer portion is at least 5 volume % and at most 25 volume %, and austenite grain size number of said surface layer portion is 11 or higher.

10. The support structure (10A, 10B) receiving thrust load of a manual transmission according to claim 9, wherein nitrogen content of said surface layer portion is in the range of 0.1 mass % to 0.7 mass %.